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The determinants of Brazilian corporate credit ratings: How did the market react to sovereign downgrades?

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Abstract

The first purpose of this research is to study which are the main determinants of the changes of Brazilian corporate credit ratings provided by Standard & Poor's. Panel regressions are applied in order to analyze the relations between ratings and seven determinants. Results show five statistically significant determinants.

The second part of the study examines how Brazilian listed companies reacted to the recent sovereign downgrades issued by Standard & Poor, Moody's and Fitch. Event study methodology is used. All the events deliver empirical evidences of negative abnormal returns, showing a strong negative correlation between the credit rating negative actions and the Brazilian stock market. When aggregating the events, downgrades to junk territory and Moody's rating's changes are the ones upsetting stocks returns the most.

Key Words: *Corporate Rating, Sovereign Downgrade, Event Study, CAAR*

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1. Introduction

Credit rating agencies play an important role in modern financial markets since they have privileged access to private information about security issuers thanks to their needed screening processes. According to Kang and Liu (2007), credit ratings have been historically embraced by financial markets because the levels and changes in ratings demonstrated to be a measure of the likelihood of defaults.

Companies in Brazil, and elsewhere, generally seek credit ratings to facilitate their issuance of bonds and commercial paper. Investors normally prefer rated securities to unrated securities and generally, the higher the rating, the larger is the second market of the related financial securities. Higher ratings securities are then easier to sell and exchange. In addition to that, some financial institutions are prohibited by their by-laws to invest in securities which ratings are below a certain level, especially in emerging markets. Changes in ratings can reflect variations of investor's positions; they can strongly affect financial securities' prices as well.

The Brazilian firms are mostly rated by the two leading rating agencies, Standard and Poor's and Moody's. Each of these agencies rate individual companies for both long-term and short-term obligations (commercial paper). Standard and Poor's further expands the rating classification in terms of local currency and foreign currency ratings. Credit ratings, in an emerging market as Brazil, are important not only because they help to assess risk in the Brazilian capital markets, but they also affect the ability of the Brazilian firms to borrow in overseas markets and in foreign currency.

According to Han, Shin, Reinhart, and Moore (2009), credit ratings, especially those issued by Standard & Poor's and Moody's, are critical to international investors who

wish to invest in corporate debt from emerging markets. Normally financial information in emerging markets is considerably less transparent than in advanced markets, this is due to a lack of reliable financial institutions that can certify the safety of an obligation to international investors.

Standard and Poor's screening for each firm is both quantitative and qualitative, it attempts to capture the unique characteristics of each issuer. Factors that could affect the rating are the industry regulations, its competition and functional activities, management strategy, expected growth, risk profile, and the shareholders structure and vision. Identifying an pragmatic relationship between the qualitative factors and the ratings is complicated. However, Standard and Poor's indicate that financial ratios play a key role in assigning ratings. According to Lopes and Walker (2012), the Brazilian market is characterized by low law enforcement, high manipulation of financial statements due to tax influences, an unstable financial market and modest governance standards. In this sense, it is not clear if credit ratings play a significant role in the Brazilian market.

Emerging markets in general have some specific characteristics that can lead to different results than those found in other more developed markets. Different regulations, governance standards and lower liquidity can lead to different results compared to mature markets.

This study initially tries to find out which are the main determinants of corporate credit ratings in Brazil. Starting from some hypothesis, it then studies the behavior of seven determinants in relation to the corporate credit ratings' movements.

Due to the overall economic instability following the recent financial meltdown, sovereign downgrades outpaced upgrades in the last years. During the European debt crisis, almost every European sovereign debt suffered downgrades from the main rating agencies (Standard & Poor's - Moody's - Fitch). Similarly, during the recent commodities crisis, most of the emerging markets "commodity-dependent" sovereigns were downgraded. In the meantime Brazil suffered an economic and political breakdown that brought rating agencies to downgrade several times the national debt.

The second part of the research tries to understand how these recent sovereign Brazilian debt's downgrades affected the stock market, studying the behavior of the stocks returns of the main Brazilian listed firms that are part of the Ibovespa index.

After studying the relation between quantitative determinants and ratings, it is of the study interest to understand how Brazilian companies reacted to negative changes of the national rating. The sovereign rating of a country is often seen as the maximum rating for the national companies; downgrades of the broad debt strongly affect companies' ratings. The research tries to evaluate how these changes affected companies' stock returns, expanding the previous research on Brazilian firms.

2. Literature Review

Credit risk is related with the capacity of a lender to fulfill its obligations. The concept of credit risk can be seen as the probability of an issuer to default, that leads to non-payment of interest and/or principal. Corporate Rating, in the Australian case, per Gray (2006), is "an independent valuation of a firm's ability to make debt payments in time".

Normally credit ratings are associated to letters. Table 1 shows Standard & Poor's rating definitions for long-term issue credit ratings.

Table 1

Long-Term Issue Credit Ratings*

Category	Definition
AAA	An obligation rated 'AAA' has the highest rating assigned by Standard & Poor's. The obligor's capacity to meet its financial commitment on the obligation is extremely strong.
AA	An obligation rated 'AA' differs from the highest-rated obligations only to a small degree. The obligor's capacity to meet its financial commitment on the obligation is very strong.
A	An obligation rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher-rated categories. However, the obligor's capacity to meet its financial commitment on the obligation is still strong.
BBB	An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.
BB; B; CCC; CC; and C	Obligations rated 'BB', 'B', 'CCC', 'CC', and 'C' are regarded as having significant speculative characteristics. 'BB' indicates the least degree of speculation and 'C' the highest. While such obligations will likely have some quality and protective characteristics, these may be outweighed by large uncertainties or major exposures to adverse conditions.
BB	An obligation rated 'BB' is less vulnerable to nonpayment than other speculative issues. However, it faces major ongoing uncertainties or exposure to adverse business, financial, or economic conditions which could lead to the obligor's inadequate capacity to meet its financial commitment on the obligation.
B	An obligation rated 'B' is more vulnerable to nonpayment than obligations rated 'BB', but the obligor currently has the capacity to meet its financial commitment on the obligation. Adverse business, financial, or economic conditions will likely impair the obligor's capacity or willingness to meet its financial commitment on the obligation.
CCC	An obligation rated 'CCC' is currently vulnerable to nonpayment, and is dependant upon favorable business, financial, and economic conditions for the obligor to meet its financial commitment on the obligation. In the event of adverse business, financial, or economic conditions, the obligor is not likely to have the capacity to meet its financial commitment on the obligation.
CC	An obligation rated 'CC' is currently highly vulnerable to nonpayment.
C	A 'C' rating is assigned to obligations that are currently highly vulnerable to nonpayment, obligations that have payment arrearages allowed by the terms of the documents, or obligations of an issuer that is the subject of a bankruptcy petition or similar action which have not experienced a payment default. Among others, the 'C' rating may be assigned to subordinated debt, preferred stock or other obligations on which cash payments have been suspended in accordance with the instrument's terms or when preferred stock is the subject of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.
D	An obligation rated 'D' is in payment default. The 'D' rating category is used when payments on an obligation are not made on the date due, unless Standard & Poor's believes that such payments will be made within five business days, irrespective of any grace period. The 'D' rating also will be used upon the filing of a bankruptcy petition or the taking of similar action if payments on an obligation are jeopardized. An obligation's rating is lowered to 'D' upon completion of a distressed exchange offer, whereby some or all of the issue is either repurchased for an amount of cash or replaced by other instruments having a total value that is less than par.
NR	This indicates that no rating has been requested, that there is insufficient information on which to base a rating, or that Standard & Poor's does not rate a particular obligation as a matter of policy.

Illustration source: Standard&Poors.com

The credit agencies emphasize that ratings from AA to CCC may be modified by the addition of positive (+) and negative (-) signs to show a relative position within a certain rating category. Periodical outlooks (Negative – Positive – Stable), that indicates the likely direction of the ratings in the future, are issued.

The researches regarding determinants of credit ratings start with Bouzouita and Young (1998) paper. They studied United States insurance companies that received a rating from the A.M. Best. They find out, as significant variables for the determination of credit ratings, profitability, growth in surplus, leverage, line mix, liquidity, size and organizational form.

Researches on this topic continue with Adams, Burton and Hardwick (2003) paper, they both study Insurance companies credit ratings determinants but for companies from United Kingdom. As already mentioned Gray, Mirkovic and Ragunathan (2006) study determinants for Australian companies and, regarding Brazil, Sales (2006) do a first research on 44 Brazilian banks. Bone (2007) considers just Petrobras on his study. Damasceno, Artes and Minardi (2008) paper is focused on 39 firms that operate in Brazil. Finally, Bone and Ribeiro (2009) study 16 non-financial Brazilian firms and Murcia, Rover, Rover and Borba (2011) work on a sample of 49 non-financial Brazilian firms.

All the researches try to find significance of different determinants on credit ratings. Depending on the sample and type of company, different variables seem to be significant. Profitability and leverage seem to be the most relevant ones.

It is important to mention that credit ratings have been criticized in the last years; they played a significant role in American subprime crisis. Hundreds of billions of mortgages related securities and collateralized debt obligations were rated triple A, enabling them to be traded and to have a relevant secondary market. The write-downs and losses from these securities led to the collapse of the financial system. The same agencies were again hardly criticized, during the European sovereign crisis, for excessively fueling the

debt crisis issuing "political" and strict downgrades. According to literature the rating classification process lacks transparency, leading to the question of what are the relevant factors taken into consideration by the agencies.

Reactions of the markets following changes of sovereign ratings debt have been broadly studied as well. Sovereign downgrades directly affect corporate ratings (as the sovereign debt can be seen as a measure of the overall economy health) and the loss of the sovereign investment grade can mean that investors are forced to sell country's bonds. Brooks, Faff, Hillier and Hillier (2003) found out that sovereign debt's rating upgrades have little market impact, while downgrades are normally associated to an overall reduction in the market value. In case of downgrades, S&P and Fitch were found to be the most informative ones for the markets studied.

Almeda, Cunha, Ferreira and Restrepo (2012) show that debt impairments can have considerable effects on the respective stock markets and real economy activities through the sovereign credit rating channel. Following sovereign downgrades, firms reduce their investment and reliance of the credit market. This is consistent with the increase in firms' cost of debt caused by the downgrades. Fatnassi, Ftiti and Hasnoui (2014) realize that sovereign credit signals normally have impact on financial markets. Reactions follow both own-country and closely related foreign countries. During the recent sovereign debt crisis, market of four European countries, Greece, Italy, Spain and Portugal, where affected by ratings' negative announcements. Own-country market returns' where initially affected and contaminated the neighbors' markets shortly after. In addition, an interesting research by Shang and Saito (2005) shows that the Brazilian sovereign and corporates ratings directly affect spreads of bonds' interest rates.

3. Hypothesis

3.1 Determinants of ratings hypothesis

For the first part of the research seven hypotheses are formulated. Each of these is associated to an hypothesis and has an expected relation with Brazilian corporate credit ratings.

Hypothesis 1: More profitable firms have higher credit ratings.

According to literature the proxy used for profitability is *Net Profit / Equity*.

Auditing of profitability ratios enable financial analysts and regulators to assess a company ability to continue its growth and to invest in new projects. In addition to provide an indication of a company ability to respect its obligations, measures of profitability help to understand if the company it is successful in controlling expenses adequately.

Managers of profitable companies expect to obtain higher rating that helps to improve the corporate market profile. Moreover, in general, the higher the level of profitability, the better the company's assigned credit rating.

Hypothesis 2: Bigger companies have higher credit ratings.

In many studies, company size is calculated as the *Logarithm of the total assets*, the paper will use the same proxy.

Bouzouita and Young (1998) suggest that "company size is likely to be positively correlated with assigned credit ratings because larger entities have access to a relatively wide pool of investments and are likely to realize economies of scale in their

operations". The research expects bigger companies to obtain higher ratings.

Hypothesis 3: More leveraged companies have lower credit ratings.

According to literature the used proxy for leverage is *Total Liabilities / Total assets*.

Normally, as a company increases its level of debt, it becomes, from a credit perspective, riskier. Shiu and Chiang (2008) suggest that "a firm with high debt tends to have high financial uncertainty and consequent high risk of insolvency". Its financial obligations are more likely to be found insolvent. The paper then expects an overall negative correlation between credit ratings and leverage.

Hypothesis 4: Higher company growth means higher credit ratings.

Company growth is approximated as the *Change in annual revenues*.

A company with high growth it is expected to keep increasing its revenues over time. Adams et al. (2003) shows that higher growth rates are often associated with higher credit ratings because they indicate an expected important future cash flow performance. Companies with constant and high growth are showing the market their health, therefore they are more likely to be considered less risky than companies with non-constant, low or negative growth.

Hypothesis 5: Companies with higher financial coverage have higher credit ratings.

The approximation for financial coverage is *EBIT / Interest expense*.

The financial coverage indicators attempt to understand how well a company can generate cash flow to pay its future interest expenses (Bone, 2007). As companies' cash flows decline, the default risk directly increases, as there is a reduction of earnings that could cover interest rate expenses. Therefore, this paper expects financial coverage to

be positively correlated to credit ratings.

Hypothesis 6: Higher long-term-debt-ratio means lower credit ratings.

Per Roje (2005) long-term-ratio can be approximated as *Long term debt / Total assets.*

A high level of long term debt obligations can higher the credit risk of the company, the firm can face difficulties to respect its obligations if future cash flows will not rise accordingly. In fact, the more the ratio is increasing, the more the company is going to be leveraged in the long term compared with the total assets, even more if the revenue growth is not growing at the same pace. This relationship should be particularly informative for an emerging market like Brazil, where long term is less predictable for the presence of inflation and political risks as well as other unsecure economic factors (i.e. BRL/USD exchange rate, China economic performance).

Hypothesis 7: Liquidity has a positive relationship with credit ratings.

Liquidity is approximated as *Current Assets / Current Liabilities*.

Higher liquidity helps companies to meet unpredicted needs for cash, without fronting liquidation of assets (Bouzouita & Young (1998), p. 27). Higher liquidity means a firm has a better ability to cover liabilities with its current liquid assets, in fact either they are cash or they can be transformed into it much faster than long-term assets (Roje, 2005).

3.2 Brazilian sovereign downgrades hypothesis

For the extent of the research,, this work will use event study methodology to study how Brazilian listed companies' stock returns behaved around each downgrade. Strong evidences that each downgrades affected stock prices are expected. The reaction of 58 listed Brazilian companies around 11 events are going to be studied, each representing a sovereign downgrade or a negative change in the outlook. Events' days are reported in table 2.

24.03.2014	S&P	Downgrade two notch
09.09.2014	Moody's	Negative change in the outlook
09.04.2015	Fitch	Negative change in the outlook
28.07.2015	S&P	Negative change in the outlook
11.08.2015	Moody's	Downgrade one notch
08.09.2015	S&P	Downgrade to junk
15.10.2015	Fitch	Downgrade one notch
09.12.2015	Moody's	Negative change in the outlook
16.12.2015	Fitch	Downgrade to junk
17.02.2016	S&P	Downgrade one notch
24.02.2016	Moody's	Downgrade to junk

Table 2: Brazilian sovereign debt's rating changes.

On the 24th of March 2014 S&P downgrades Brazilian debt, denominated in both local and foreign currency, from BBB+ to BBB-, following large fiscal deficits, measly growth prospects and use of accounting tricks. Shortly after, Moody's, on the 9th of September of the same year, changed the outlook from stable to negative, threatening to downgrade Brazilian debt soon if the economy would not end the slowdown and live in political instability. Fitch was the last agency to react to the Brazilian slowdown under the Rousseff government, changing the outlook from stable to negative on the 9th of April 2015.

On the 28th of June 2015, Brazil is threatened by S&P to see its credit rating cut to

junk; the agency changes its outlook on the sovereign debt from stable to negative. Soon after Moody's downgrades Brazilian debt from Baa3 to Baa2, following weaker than expected economic performance, the related increase in government expenditures and in the overall debt.

On the 9th of September 2015, for the first time since 2008, S&P downgraded Brazilian debt to BB+, the highest junk rating. The faster-than-anticipated downgrade came after amplified political problems that have muddled economic policy. On the 15th of October, Fitch downgrades Brazil to BBB-. Shortly after Fitch is the second rating agency, on the 16th of December 2015, to downgrade the sovereign debt to the highest notch of junk, citing mostly political risks. This is the downgrade that the work expects to influence the most the market as many foreign investors and pension funds are required to sell bonds once two separate agencies rate them as speculative grade.

Few days before, on the 9th of December, Moody's changed the outlook again from stable to negative, citing mostly political instability. The agency threatened to cut the debt to junk soon. That happened on the 24th of February 2016, when Moody's rating was scratched to Ba2 from Baaa3. The event brought the sovereign Brazilian debt to speculative grade for all the three main credit agencies. The economic recession, the increasing fiscal deficits, the commodities crisis, the currency devaluation and the political situation, with the president Dilma Rousseff involved in an impeachment process, were the main drivers of the downgrades.

S&P cut further the sovereign debt into junk territory on the 17th of February 2016.

Hypothesis: This paper expects to find a negative correlation between downgrades and negative changes in outlooks and the stocks returns of the main Brazilian listed companies. The most informative downgrade is expected to be Fitch one the 16th of December 2016, which brought the whole country into junk territory. The extent of the research groups the events together; S&P downgrades, since it is normally the first agency to act, and downgrades to junk, are the groupings expected to be more informative for the stock market.

4. Methodology

4.1 Panel Data Regression

In order to be able to run regressions with ratings as variables, several authors have converted ratings into numerical values. By doing so, we obtain an ordinal variable, which may be ordered.

This research will use two different conversion tables, inspired by different papers. These studies, Ashbaugh-Skaife, Collins, & LaFond, (2006); Damasceno, Artes, & Minardi, (2008); Silva, Santos, Torres, & Ferreira, (2009), have opted to split the ratings into seven groups. While Emawtee Bissoondoyal, Bheenick (2008) have opted to split the ratings into 21 groups. Table 3 and Table 4 show the different conversion ratings approach for Standard & Poor's ratings.

Table 3: Ratings conversion into 21 classes.

S&P	*CLASSES*
AAA	22
AA+	21
AA	20
AA-	19
A+	18
A	17
A-	16
BBB+	15
BBB	14
BBB-	13
BB+	12
BB	11
BB-	10
B+	9
B	8
B-	7
CCC+	6
CCC	5
CCC-	4
CC	3
C	2
D/SD	1

Table 4: Ratings conversion into 7 classes.

S&P	*CLASSES*
AAA	
AA+	
AA	7
AA-	
A+	
A	6
A-	
BBB+	
BBB	5
BBB-	
BB+	
BB	4
BB-	
B+	
B	3
B-	
CCC+	
CCC	2
CCC-	
CC	
C	1
D/SD	

Testing the correlations is also important to be sure that multicollinearity can be excluded.

The following equation is used to run the panel data regression in order to estimate the coefficients of the independent variables:

$$RATING = \beta_0 + \beta_1 Leverage + \beta_2 Profitabilty + \beta_3 Size + \beta_4 Coverage + \beta_5 Growth + \beta_6 Liquidity + \beta_7 Longtermratio + \varepsilon_1$$

The equation is used for two different dependent variables, derived from the two-different ratings conversation tables.

4.2 Event Study

Event study is used for the second part of this project. Fama et al. (1969) introduced this methodology. Since then many studies have used this methodology to produce useful evidence on how stock prices respond to a set of information. Event study analyses differentiate between the returns that would have been expected if the analyzed event would not have taken place, normally the returns calculated on a previous-event window and the returns that were caused or not by the respective event, namely the abnormal returns. They can be summarized by the following equation:

$$AR_{i,T} = R_{i,T} - E\left[R_{i,T} \middle| \Omega_{I,T}\right] \qquad (1)$$

The expected returns are then considered unconditional on the event but conditional on a separate information set. Different analytic techniques can be used; they differ with respect to the model used for predicting the normal returns before the event date.

For the objective of the research the focus is on one measure of aggregated abnormal returns. The cumulative abnormal returns (CAR) that accumulates abnormal returns across the event window and is defined as:

$$CAR_{i(T_1,T_2)} = \sum_{t=T_1}^{T_2} AR_{i,T} \qquad (2)$$

Due to the chance of downgrades prevention and anticipation by the market, this study estimates the estimation windows from 320 to 120 days before the announcement date, in order to exclude possible biased information in the pre-event window.

For the considerably high level of the risk-free rate in Brazil, it is preferred not to consider the market return model and the CAPM, since they assume a risk-free asset to compute a return premium. The market model is used.

The mentioned model is built upon the assumption of a constant and a linear relation between asset returns and the returns of a market index, such that:

$$R_{i,T} = \alpha_i + \beta_i R_{M,T} + \varepsilon_{i,T} \qquad (3)$$

with

$$E_{[\varepsilon_{i,T}]} = 0 \qquad (4)$$

and

$$VAR_{[\varepsilon_{i,T}]} = \sigma_{\varepsilon,i}^2 \qquad (5)$$

This model mainly differs from the market return model because the latter calculates abnormal returns by subtracting the returns of a market index and thus can be considered a restricted market model with alpha equal to zero and beta equal to one for each stock.

Furthermore, the market model parameters in the estimation window are estimated by ordinary least squares (OLS) method.

The main test statistic in this paper is the t-test statistic. The t-test statistic for the null hypothesis is that the cumulative average abnormal return (CAAR) is equal to zero. The t-test for the time series is defined as follows:

$$T_{time} = \frac{CAAR_t}{(T_2 - T_1 + 1)^{\frac{1}{2}} \alpha_{AAR_t}} \qquad (6)$$

The statistics follows asymptotically normal distribution. The returns of the estimation window (that goes from 320 to 120 prior the event) are the basis for the variance estimator of the t-statistic, where M is the number of non-missing returns and d the degrees of freedom (e.g. market model d = 2), such that:

$$\widehat{\sigma}^2_{\mathrm{AAR_t}} = \frac{1}{\mathrm{M-d}} \sum_{\mathrm{t=Est_{min}}}^{\mathrm{Est_{max}}} \left[\mathrm{AAR_t} - \frac{1}{\mathrm{M}} \sum_{\mathrm{Est_{min}}}^{\mathrm{Est_{max}}} (\mathrm{AAR_t})\right]^2 \qquad (7)$$

The post-event window abnormal returns are out-of-sample predictions and thus the standard error should be adjusted by the forecast error. The adjustment for the market model is such that:

$$\sqrt{1 + \frac{1}{\mathrm{M}} \frac{\left(\mathrm{R_{m,t}} - \overline{\mathrm{R}}_{\mathrm{m,Est}}\right)^2}{\sum_{\mathrm{Est_{min}}}^{\mathrm{Est_{max}}} \left(\mathrm{R_{m,t}} - \overline{\mathrm{R}}_{\mathrm{m,Est}}\right)^2}} \qquad (8)$$

5. Data and Sample

To study the independent variables' hypothesis the research uses financial information of public Brazilian companies available on Wharton Database.

Regarding credit ratings, historical Standard & Poor's long term local currency ratings are used, which are available on Bloomberg. Stock prices of Brazilian listed companies, as well as Ibovespa index, are from Bloomberg.

The first part of the research does not include financial companies for their differences in accounting standards and interpretation of various ratios. The period in consideration goes from 2007 to 2015. Due to the relatively young age of the fixed income market, in Brazil most of the companies were not rated before 2006-2007. Companies with no credit ratings or credit ratings issued by other agencies are not considered. Starting from a sample of 118 non-financial companies, to make observations reliable, the sample is reduced to 35 Brazilian companies for a total 280 number of observations. In the cases where more than one rating is assigned for a certain company during a year, only the last rating issued during the year is considered.

For the study on the sovereign downgrades effects on the stock market, the period took in consideration is between 2014 and 2016. Events are the recent Brazilian downgrades days of the major rating agencies, Standard & Poor, Moody's and Fitch. The number of listed companies that are taken in consideration is 58, according to data available. Daily returns of listed Brazilian companies are constructed from Bloomberg daily prices. Downgrades informations are from Bloomberg as well.

6. Results

6.1 Regressions Results

As already mentioned, to find out the determinants of credit rating in Brazil, panel data regression is used. Credit ratings (*RatingN*) and (*RatingN1*) have been the dependent variables for the regression and seven independent variables have been implemented (*Leverage, Profitability, Size, Coverage, Growth, Liquidity, Longtermratio*).

Table 4 shows descriptive analysis (minimum, maximum, mean, median and standard deviation) of the independent variables.

Table 4: Descriptive analysis of the independent variables.

Variables	Min	Max	Mean	Median	Std
COVERAGE	-2,69	115,54	4,28	2,61	8,31
GROWTH	-0,93	2,09	0,13	0,12	0,25
LEVERAGE	0,33	1,39	0,63	0,62	0,15
LIQUIDITY	0,21	3,77	1,53	1,44	0,70
LONGTERMRATIO	0,02	0,73	0,29	0,26	0,12
PROFITABILITY	-5,99	5,28	0,10	0,13	0,67
SIZE	6,38	13,58	9,32	9,31	1,40

I find out the frequency distributions for my two dependent variables. Table 5 and Table 6 show the results.

Table 5: Frequency distribution for ratings conversion split in 7 classes.

Value	Count	Percentage %
1	2	0,71
2	8	2,86
3	10	3,57
4	81	**28,93**
5	71	25,36
6	51	18,21
7	57	20,36

Table 6: Frequency distribution for rating conversion split in 22 classes.

Value	Count	Percentage %
1	2	0,71
2	0	0
3	0	0
4	0	0
5	3	1,07
6	5	1,79
7	8	2,86
8	2	0,71
9	0	0
10	15	5,36
11	35	12,5
12	31	11,07
13	49	**17,5**
14	13	4,64
15	9	3,21
16	13	4,64
17	20	7,14
18	18	6,43
19	11	3,93
20	18	6,43
21	15	5,36
22	13	4,64

Table 7 shows the results of the correlation matrix, helpful to check for multicorrelation between the independent variables. Correlation between the variable are relatively low. Highest correlation registered is the 54,2% between *Leverage* and *Longtermratio*. I can then assume absence of multicorrelation and that results are not going to be biased by that.

Table 7: Correlation matrix for the independent variables.

Variables	COVERAGE	GROWTH	LEVERAGE	LIQUIDITY	LONGTERMRATIO	PROFITABILITY	SIZE
COVERAGE	1	0,052	-0,212	-0,076	-0,277	0,099	0,132
GROWTH		1	0,06	-0,095	0,03	0,072	0,057
LEVERAGE			1	**-0,288**	**0,542**	-0,045	**-0,288**
LIQUIDITY				1	0,197	-0,033	0,24
LONGTERMRATIO					1	-0,011	0,001
PROFITABILITY						1	0,001
SIZE							1

Table 8 shows the results of the panel data regression for the first dependent variable, *RatingN*.

Table 8: Panel data regression results for RatingN.

RATINGN	Coefficient	Std. Error	t	P > |t|
LEVERAGE	-5,33178	0,78636	-6,78	0,00
PROFITABILITY	0,350913	0,07503	4,68	0,00
SIZE	1,391126	0,15605	8,91	0,00
COVERAGE	0,026486	0,00681	3,89	0,00
GROWTH	0,015269	0,19098	0,80	0,42
LIQUIDITY	0,162500	0,1505	1,08	0,28
LONGTERMRATIO	3,374822	0,8511	3,97	0,00
R-sq	0,4452			

Leverage, Profitability, Size, Coverage and *Longtermratio* are statistically significant variables, at 5% level of significance, to explain the dependent variable *RatingN*, which is generated from the first conversion table (7 groups). *Growth* and *Liquidity* are not statistically significant and they are not considered in the conclusions. In term of significance of the variables, same results appear for the second panel data regression, which results are shown in table 9, that has as dependent variable *RatingN1*, constructed from the second conversion table (22 groups). *Growth* and *Liquidity* are again not statistically significant at the 5% level. R-Squared are respectively 44,52% and 29,77%.

Table 9: Panel data regression for RatingN1.

RATINGN1	Coefficient	Std. Error	t	P > |t|
LEVERAGE	-1,200992	0,366111	-3,28	0,00
PROFITABILITY	0,124599	0,034932	3,57	0,00
SIZE	0,471873	0,072651	6,50	0,00
COVERAGE	0,010713	0,003169	3,38	0,00
GROWTH	-0,004734	0,088915	-0,05	0,96
LIQUIDITY	0,131245	0,070069	1,87	0,06
LONGTERMRATIO	1,153086	0,696245	2,91	0,00
R-sq	0,2977			

It is immediate to observe that the effects of variables on the dependent variables are the same. For *RatingN1*, *Leverage* is equally the only variable that delivers a negative coefficient.

For both the first and the second regression, Hypothesis 1, Hypothesis 2, Hypothesis 3 and Hypothesis 5 are not going to be rejected as *Profitability, Size* and *Coverage* are positively related to credit ratings as expected. *Leverage*, therefore, in negatively related to my dependent variables. Only Hypothesis 6 should be rejected, in fact *Longtermratio* variable looks to determine in a positive way corporate credit ratings that goes against the negative hypothesized effect. This result could be related to different currencies used when issuing debt obligations and to a possible positive "rating bias" whenever Dollar denominated debt was issued, especially during the period when the Brazilian Real strongly appreciated against the US dollar.

Using different credit ratings conversions do not lead to different a result, which helps to understand the reliability of the findings.

6.2 Event Study Results

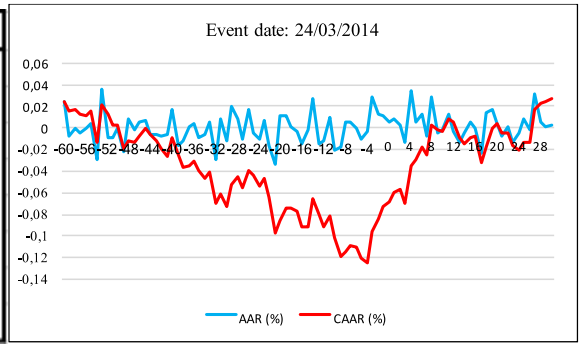
For the second purpose of the study, the next tables show event study results for the 11 events on which the research focuses. The estimation window goes from 320 days prior the event to 120 days before it. These windows follow previous results with closer-to-the-event windows that showed important movements of returns anticipating the events. It was then of the work interest to increase the size of the estimation windows.

It is also important to have results with different event windows, with 0 set as the event date, there are larger ones that go from -60 days to +30, from -60 to 0, from -30 to 0, from 0 to +30, days before and after the events. Some shorter ones have been implemented as well (from -10 to +10, from -5 to +5, from -2 to +2 and from -1 to +1, days before and after the events). From cumulative abnormal returns results and graphs' analysis it is possible to analyze if anticipations of the market happened.

After the individual study of each event the research continues grouping the events in three different ways. The first grouping separates all the events from the "junk" downgrades, the ones that brought the sovereign debt into junk territory. This approach continues in the second grouping, separating "normal" sovereign downgrades, "junk" downgrades and the negative changes in outlook. The last one strives to analyze each rating company individually, to attest how the market reacted to separately S&P, Moody's and Fitch downgrades.

Table 10: 24/03/2014 S&P downgrades Brazil of two notches

Event Windows	CAAR	t-test	prob.
(-60...30)	0,0272	0,8683	0,385
(-60...0)	-0,0677	-2,6431	0,008
(-30...0)	-0,0067	-0,3664	0,714
(-2...2)	0,0402	5,4769	0,000
(-1...1)	0,0245	4,3088	0,000
(-5...5)	0,0803	7,3796	0,000
(-10...10)	0,0774	5,1488	0,000
(0...30)	0,0999	5,4667	0,000



The results show strong evidence against the null hypothesis for all but two windows. Surprisingly the only window that delivers negative CAAR is the (-60; 0) window. The longest post-event window (0; 30) shows significant positive CAAR, as well as the shortest windows around the event. It seems that the market anticipated the downgrade. The event itself was not informative as the market already "priced" the sovereign downgrade in the previous weeks. Nevertheless, the negative CAAR suggests that the news and the possibility of a downgrade negatively affected the market. By analyzing the figure, it is easier to assess the anticipation of the market, with the CAAR decreasing substantially approximately 40 days before the event.

Table 11: 09/09/2014 Moody's changes the outlook to negative

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,1093	-3,4442	0,0006
(-60...0)	0,0195	0,7507	0,4528
(-30...0)	0,0072	0,3905	0,6961
(-2...2)	-0,0572	-7,6903	0,0000
(-1...1)	-0,0449	-7,7973	0,0000
(-5...5)	-0,0471	-4,2713	0,0000
(-10...10)	-0,0289	-1,8985	0,0576
(0...30)	-0,1544	-8,3384	0,0000

Moody's change of the outlook to negative seems to be less market anticipated than the first downgrade. (-2; 2), (-1; 1) and (-5; 5) windows all show negative statistically

significant CAARs. That suggests that Moody's did not release as many information about its move as S&P previously did.

Table 12: 09/04/2015 Fitch changes the outlook to negative

Event Windows	CAAR	t-test	prob.
(-60...30)	0,1353	4,0548	0,0001
(-60...0)	0,0898	3,2856	0,0010
(-30...0)	0,0956	4,9084	0,0000
(-2...2)	0,0204	2,6045	0,0092
(-1...1)	-0,0073	-1,1975	0,2311
(-5...5)	0,075	6,4616	0,0000
(-10...10)	0,0914	5,7036	0,0000
(0...30)	0,045	2,3121	0,0208

Fitch was the last rating agency to react to Brazil poor macroeconomic results and recession. Its change in the outlook to negative did not affect the market. Results show statistically significant positive CAARs both before and after the event (-60; 0) (0; 30) deliver positive results, suggesting a positive trend that did not suffer changes after the announce.

Table 13: 28/07/2015 S&P changes outlook to negative

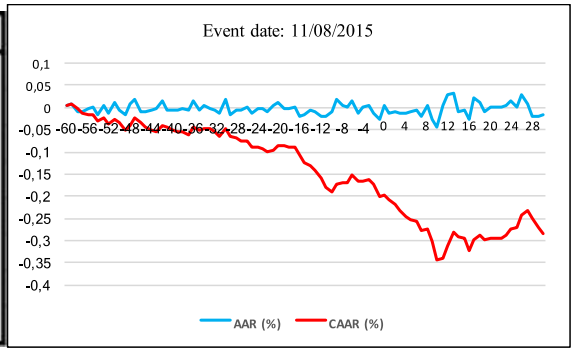
Event Windows	CAAR	t-test	prob.
(-60...30)	-0,2804	-7,853	0,0000
(-60...0)	-0,1773	-6,0647	0,0000
(-30...0)	-0,1422	-6,8244	0,0000
(-2...2)	-0,0269	-3,213	0,0013
(-1...1)	-0,0128	-1,9695	0,0489
(-5...5)	-0,0575	-4,6331	0,0000
(-10...10)	-0,0981	-5,7183	0,0000
(0...30)	-0,1127	-5,4086	0,0000

S&P change in the outlook was anticipated as the previous agency downgrade. The (-30; 0) window shows important significant negative CAAR, that leads to assume that the move was expected before the actual official news. Nevertheless, around the event

date, CAAR shows high negative values. It can be assumed that the Brazilian environment was influenced by this change but it was also preparing for the future downgrades.

Table 14: 11/08/2015 Moody's downgrades one notch

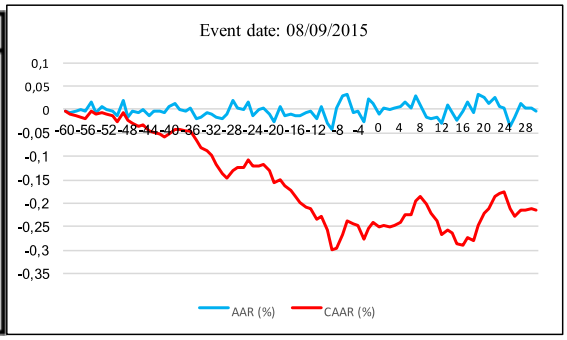
Event Windows	CAAR	t-test	prob.
(-60...30)	-0,2856	-7,9147	0,0000
(-60...0)	-0,1955	-6,6169	0,0000
(-30...0)	-0,1296	-6,1549	0,0000
(-2...2)	-0,0547	-6,4703	0,0000
(-1...1)	-0,0338	-5,1646	0,0000
(-5...5)	-0,1002	-7,9884	0,0000
(-10...10)	-0,165	-9,5179	0,0000
(0...30)	-0,0846	-4,0188	0,0001



Evidences from graph's analysis and the (-30; 0) window, shows that Moody's downgrade to Baa2 was slightly anticipated by the market. All the CAAR results show strong significant results and it is possible to observe a severe increase in the CAARs negative values in the windows around the downgrade. These results show an important negative reaction of the market following the event, even if a part of the shock was already absorbed in the previous to the event days.

Table 15: 08/09/2015 S&P downgrades to junk

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,2159	-5,9668	0,0000
(-60...0)	-0,2503	-8,449	0,0000
(-30...0)	-0,1339	-6,34	0,0000
(-2...2)	0,0261	3,0715	0,0021
(-1...1)	0,0041	0,6233	0,5331
(-5...5)	0,0109	0,8698	0,3844
(-10...10)	0,0073	0,4224	0,6727
(0...30)	0,0239	1,1321	0,2576

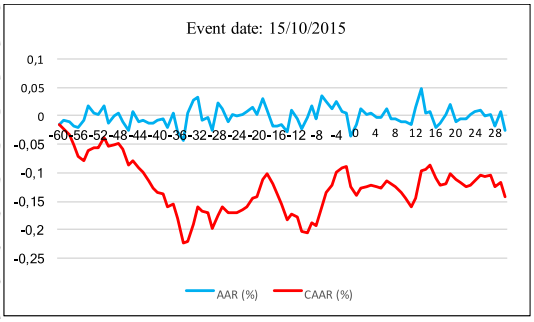


As observed before, S&P downgrades tend to be largely anticipated by the Brazilian market. The statistically significant window (-2; 2) delivers positive CAAR results

equal to 0,0261. From the graph, it is possible to assume that the equity market anticipated the move approximately 20 days before the event as the CAAR drastically dropped. The (-30; 0) window shows negative significant results equal to -0,1339.

Table 16: 15/10/2015 Fitch downgrades one notch

Event Window	CAAR	t-test	prob.
(-60...30)	-0,1425	-3,9555	0,0001
(-60...0)	-0,1387	-4,7022	0,0000
(-30...0)	0,0276	1,3125	0,1893
(-2...2)	-0,0327	-3,8715	0,0001
(-1...1)	-0,0383	-5,8564	0,0000
(-5...5)	0,0068	0,5466	0,5846
(-10...10)	0,0567	3,2728	0,0011
(0...30)	-0,0189	-0,8982	0,3691



Fitch downgrade to the last level of investment grade came after S&P downgrade to junk. The trend was negative around the period and it is difficult to assess if the downgrade was anticipated or not. The short-term windows (-2; 2) and (-1; 1) both deliver significant negative values, implying that the event negatively influenced the market in the short term.

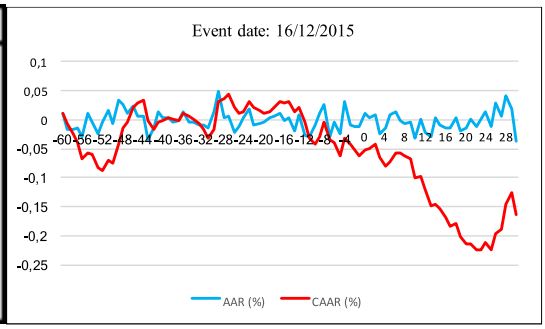
Table 17: 09/12/2015 Moody's changes outlook to negative

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,1428	-3,7581	0,0002
(-60...0)	0,0103	0,3307	0,7409
(-30...0)	-0,0670	-3,0211	0,0025
(-2...2)	-0,0350	-3,9241	0,0001
(-1...1)	0,0028	0,4022	0,6876
(-5...5)	-0,0170	-1,2894	0,1973
(-10...10)	-0,0958	-5,248	0,000
(0...30)	-0,1762	-7,9413	0,000

Moody's change in the outlook gives a significant negative value for the (-2; 2) window of -0.0350. That imply a short-term market movement following the announcement, even if the (-1; 1) window delivers non-significant values.

Table 18: 16/12/2015 Fitch downgrades to junk

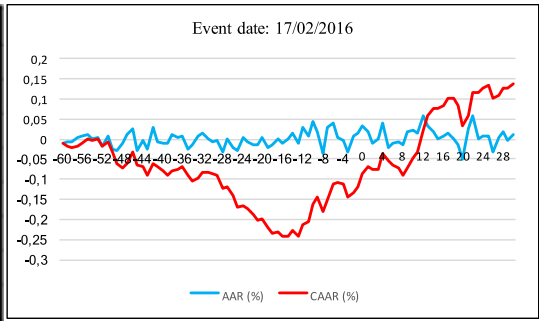
Event Windows	CAAR	t-test	prob.
(-60...30)	-0,1622	-4,2135	0,0000
(-60...0)	-0,0524	-1,6614	0,0966
(-30...0)	-0,0211	-0,9414	0,3465
(-2...2)	-0,0005	-0,0568	0,9547
(-1...1)	0,0035	0,5070	0,6122
(-5...5)	-0,0315	-2,3530	0,0186
(-10...10)	-0,0662	-3,5813	0,0003
(0...30)	-0,0988	-4,3985	0,0000



Fitch downgrade on the 16th of December 2016 brought the whole Brazil debt into junk territory. Event study results are helpful to suggest that the market did not react in the period before the event. Both the shortest-term windows lack of statistical significance, while the (-10;10) and (0;30) windows deliver significant negative results. It is possible to assume that the market itself took some days to adjust and react to Fitch downgrade to junk. From a graph analysis, the CAAR looks to suffer an important drop approximately eight days after the event. Results show a late response to the event: the result could be also red as an anticipation of the following downgrades.

Table 19: 17/02/2016 Moody's downgrades to junk

Event Windows	CAAR	t-test	prob.
(-60...30)	0,1373	3,3870	0,0007
(-60...0)	-0,0853	-2,5692	0,0102
(-30...0)	-0,0038	-0,1605	0,8725
(-2...2)	0,0670	7,0494	0,0000
(-1...1)	0,0677	9,1954	0,0000
(-5...5)	0,0556	3,9485	0,0001
(-10...10)	0,1590	8,1677	0,0000
(0...30)	0,2573	10,8732	0,0000

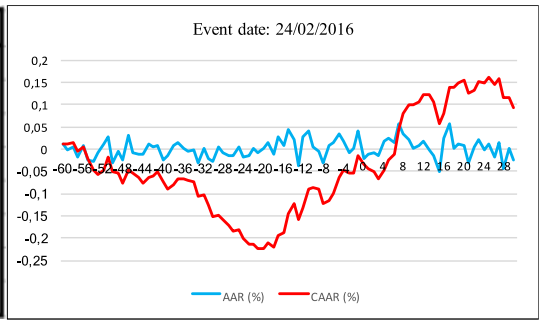


Moody's was the last agency to downgrade the Brazilian sovereign debt to junk. Results show a clear anticipation of the downgrade, as it is also possible to observe in the figure. CAAR value for the (-60; 0) window is significantly negative, while results for

the (-2; 2) (-1; 1) (-10; 10) and (0; 30) windows all deliver positive significant results. These outputs help to confirm market anticipation and show an important recovery in the period that followed the event. Probably, as Brazil as the whole country was already in the junk territory, a downgrade from the third main credit agency did not worry the market for long.

Table 20: 24/02/2016 S&P downgrades one notch

Event Windows	CAAR	t-test	prob.
(-60...30)	0,091	2,2438	0,0248
(-60...0)	-0,0339	-1,0208	0,3073
(-30...0)	0,0903	3,8135	0,0001
(-2...2)	0,0035	0,3679	0,7130
(-1...1)	0,0085	1,1562	0,2476
(-5...5)	0,0737	5,2238	0,0000
(-10...10)	0,1897	9,7394	0,0000
(0...30)	0,1044	4,4091	0,0000



S&P downgrades Brazil into deeper junk territory on the 24/02/2016. This downgrade came shortly after Moody's one. CAAR analysis ends to be similar to the previously mentioned downgraded. The work assumes that the market anticipated both the movements, as they came one week after each other. (-30; 0) window delivers positive significant value, implying that the anticipation was offset by a strong market recovery. All the short term and after-event windows deliver significant positive values.

Aggregate Samples 1; Downgrades to junk– All other events

Table 21: Aggregated downgrades to junk

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,0988	-2,9747	0,0029
(-60...0)	-0,1044	-5,2493	0
(-30...0)	-0,0491	-3,7329	0,0002
(-2...2)	0,0034	1,1196	0,2629
(-1...1)	0,0111	1,2712	0,2037
(-5...5)	-0,0261	-2,9747	0,0029
(-10...10)	-0,0255	-2,823	0,0048
(0...30)	0,022	-0,2452	0,8063

When grouping the three downgrades that brought Brazilian sovereign debt into junk territory, it is possible to observe strong and significant CAAR results for the (-30; 0) and (-60; 0) windows. That shows some clear market anticipation of the relevant downgrades. The closer to the event windows are not significant, while the (-5; 5) and (-10; 10) windows deliver negative significant results. It is possible to assume that the studied stocks were still negatively affected by the event downgrades, even after some strong anticipation.

Table 22: Aggregated other events

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,0794	-3,8787	0,0001
(-60...0)	-0,0683	-5,8287	0
(-30...0)	-0,0167	-1,1859	0,2357
(-2...2)	-0,0078	-1,5573	0,1194
(-1...1)	-0,0077	-1,8359	0,0664
(-5...5)	0,0144	2,5284	0,0115
(-10...10)	0,0237	2,807	0,005
(0...30)	-0,0239	-2,6716	0,0075

All the other events together deliver some interesting and contrasting results. The (-60; 0) window's CAAR are significantly negative, showing again some anticipations. But the contrasting results come from the (-5; 5) and (-10; 10) windows, which deliver

positive and significant CAAR results. This unexpectedly shows how around these events Brazilian stocks were not overall negatively influenced and how they probably already priced the negative rating actions.

Aggregate Samples 2; Downgrades –Downgrades to Junk –Changes in outlooks

Table 23: Aggregated normal downgrades

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,0616	-0,7167	0,4736
(-60...0)	-0,0987	-6,1756	0
(-30...0)	-0,0183	-1,1716	0,2414
(-2...2)	-0,0041	0,648	0,517
(-1...1)	0,0004	0,7997	0,4239
(-5...5)	0,0144	3,2258	0,0013
(-10...10)	0,0273	2,9226	0,0035
(0...30)	0,0340	2,1644	0,0304

For the second grouping I firstly observe results for all the negative downgrades from the three main rating agencies. The (-60; 0) window delivers once again negative and significant results that could imply some market anticipation. (-5; 5) (-10; 10) and (-30; 30) windows show, similar as in table 22, positive and significant CAAR results that is again surprising. These events were probably already priced into stocks prices and the events themselves were not significant for the overall market.

Table 24: Aggregated changes in outlooks

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,1024	-4,2857	0,0000
(-60...0)	-0,0196	-0,4776	0,6330
(-30...0)	-0,0285	-1,3968	0,1625
(-2...2)	-0,0249	-5,7302	0,0000
(-1...1)	-0,0159	-4,0231	0,0001
(-5...5)	-0,0126	-2,5786	0,0099
(-10...10)	-0,0324	-3,8918	0,0001
(0...30)	-0,0984	-7,9626	0,0000

Changes in outlook, when analyzed together, can help to draw interesting conclusions. The close to the events windows (5; 5), (-2; 2) and (-1; 1) all deliver statistically significant and strong evidences that stocks returns were negatively affected by these events. The windows that study prior to the event CAAR do not have statistically significant results. Compared to the previously discussed groupings, in this case there are fewer instances of market anticipations and the negative CAARs show clearly how Brazilian stocks were directly affected by the events themselves. The last window (0; 30) strengthen this finding, CAAR is large and significantly negative.

Aggregate Samples 3; S&P - Moody's - Fitch

Table 25: Aggregated S&P ratings changes

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,0812	-2,5643	0,0103
(-60...0)	-0,1400	-8,4735	0,0000
(-30...0)	-0,0694	-6,1098	0,0000
(-2...2)	0,0257	5,7087	0,0000
(-1...1)	0,0201	5,4461	0,0000
(-5...5)	0,0218	2,6884	0,0072
(-10...10)	0,0346	3,6076	0,0003
(0...30)	0,0633	4,3955	0,0000

S&P events studies show strongly significant CAARs but contrasting results. From the above values, it is easy to deduce that all the S&P negative sovereign downgrades were strongly anticipated. CAARs of the prior to the event windows are negative and large while for the closer to the event windows results are strongly statistically significant and positive. Events anticipation is clear in this instance.

Table 26: Aggregated Moody's ratings changes

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,1164	-4,4696	0,0000
(-60...0)	-0,0530	-3,5504	0,0004
(-30...0)	-0,0279	-1,3178	0,1876
(-2...2)	-0,0362	-6,7022	0,0000
(-1...1)	-0,0166	-4,3383	0,0000
(-5...5)	-0,0257	-3,1564	0,0016
(-10...10)	-0,0288	-4,2070	0,0000
(0...30)	-0,0800	-6,7022	0,0000

Moody's event studies deliver some different results; in fact, market anticipation is less clear and significant. The (-30; 30) shows not significant results while all the closer to the events windows have significance and show negative values. It is possible to deduce that Moody's shares less information about its future rating movements and stocks' returns are more directly affected from the negative changes in ratings rather than from previous-to the events news.

Table 27: Aggregated Fitch ratings changes

Event Windows	CAAR	t-test	prob.
(-60...30)	-0,0470	-1,1867	0,2354
(-60...0)	-0,0291	-0,8834	0,3770
(-30...0)	0,0363	2,9074	0,0036
(-2...2)	-0,0034	-0,2769	0,7819
(-1...1)	-0,0142	-3,0063	0,0026
(-5...5)	0,0175	1,6944	0,0902
(-10...10)	0,0300	2,4525	0,0142
(0...30)	-0,0194	-1,9448	0,0518

Fitch events, when individually studied, are the less significant, and the aggregate results are difficult to analyze as well; the agency mostly reacted to the other main agencies ratings actions. An interesting result comes from the shortest window (-1; 1) that delivers negative significant values. The negative events themselves affected Brazilian stocks' returns but not constantly and decisively as the other two credit rating agencies, S&P and Moody's.

7. Conclusions

This research first aims to identify the determinants of credit ratings in Brazil. Two panel data regression are built, with credit ratings as dependent variable and seven other independent variables: *Leverage, Profitability, Size, Coverage, Long-term-ratio, Growth and Liquidity*. The sample contained 280 credit ratings observations, issued by Standard & Poor's, from 35 Brazilian public companies for the period from 2007 to 2015. Empirical results show that, for both regressions, five variables are statistically significant at a 5% level: *Leverage, Profitability, Size, Coverage* and *Long-term-ratio*. *Long-term-ratio* variable shows a positive relation with the dependent variables, which goes against the negative hypothesized effect. Debt issued in foreign currencies, mainly US dollars, could help to explain this finding. Whenever the home currency is relatively strong compared to the issuing currency, long term obligations could be considered helpful and convenient for the future of the company.

For the second part of the study, the research strives to understand how the Brazilian stock market reacted to Sovereign downgrades. Event studies are used to help assess companies' abnormal returns values before, around and after the events. The sample contained 58 companies that are part of the Brazilian Ibovespa index around the events period. Results suggest market anticipation for all but two events. CAAR results in the pre-event windows are often negative, significant and large. S&P downgrade to junk on the 8th of September 2016 is the most informative for the market as CAAR outputs deliver the highest negative values. The hypothesis of Fitch downgrade to junk to be the most informative is rejected, as the market was not that responsive previously or shortly after the event. All the events took in consideration deliver negative abnormal returns,

showing a strong negative correlation between the credit rating actions and the Brazilian stock market.

When aggregating the events in different groups, junks downgrades deliver the greatest negative CAAR and surprisingly, collectively, negative changes in outlooks seem more informative than simple negative downgrades. Market anticipation for the latter group is greater but negative values do not upset the ones of the former group. S&P movements result to be the most market anticipated ones while Moody's negative ratings changes are the ones negatively affecting stock returns the most. Fitch downgrades do not affect returns as the other agencies actions do.

Overall, the research shows how the sovereign rating directly affects equities as well as bonds ratings. Financial ratios are crucial to define ratings but the overall country debt influences the entire market.

8. References

Adams, M., Burton, B., & Hardwick, P. (2003). The determinants of credit ratings in the United Kingdom insurance industry. Journal of Business Finance & Accounting, 30(3/4), 539-572.

Almeida, H., I. Cunha, M. Ferreira, & F. Restrepo (2014): The Real Effects of Credit Ratings:The Sovereign Ceiling Channel. Working Paper.

Bone, R. B. (2007). Determinantes de ratings corporativos no setor de petróleo: o caso da Petrobrás. 107-125.

Bone, R. B., & Ribeiro, E. P. (2009). Conteúdo informacional dos ratings corporativos de empresas brasileiras, 1995-2007. Anais do Encontro Brasileiro de Finanças.

Bouzouita, R., & Young, A. (1998). A probit analysis of best ratings. Journal of Insurance Issues, 21(1), 23-34.

Brooks, R., Faff, R., Hillier, D. & Hillier, J., (2003), Do stock markets react to the re-rating of sovereign risk?, Journal of the Securities Institute of Australia, issue 4, pp. 2-8.

Choy, E. Y. W., Gray, S. F., & Ragunathan, V. (2006). Effect of credit rating changes on Australian stock returns. Accounting and Finance, 46(5), 755-769.

Damasceno, D. L., Artes, R., & Minardi, A. M. C. F. (2008). Determinação de rating de crédito de empresas brasileiras com a utilização de índices contábeis. Revista de Administração, 43(4), 344-355.

Ftiti Z. Fatnassi, I. & H. Hasnaoui (2014). Stock market reactions to sovereign credit rating changes: evidence from four european countries. Journal of Applied Business Research, 30(3).

Gray, S., Mirkovic, A., & Ragunathan, V. (2006). The determinants of credit ratings: Australian evidence. Australian Journal of Management, 31(2), 333-354.

Han, S. H., Shin, Y. S., Reinhart, W., & Moore, W. T. (2009). Market segmentation effects in corporate credit rating changes: the case of emerging markets. Journal of Financial Services Research, 35(2), 141-166.

Kang, Q., & Liu, Q. (2007). Credit rating changes and CEO incentives [Working Paper]. Social Science Research Network.

Lopes, A., & Walker, M. (2012). Asset revaluations, future firm performance and firm-level corporate governance arrangements: new evidence from Brazil. The British Accounting Review, 44(2), 53-67.

Murcia, F. C. d. S., Murcia, F. D., Rover, S., & Borba, J. A. (2014). The determinants of credit rating: Brazilian evidence. Brazilian Administration Review, 11, 188-209.

Roje, G. (2005). The role of accounting determinants in predicting long term credit ratings. Proceedings of the European Accounting Association Congress, Gotheborg, Sweden, 28.

Sales, B. F. (2006). Desenvolvimento de metodologia de rating baseado no modelo ordered probit (Dissertação de mestrado). Fundação Getúlio Vargas, Rio de Janeiro, Brasil.

Sheng, H. & Saito, R. (2005). Determinantes de spread das debêntures no mercado brasileiro. Revista da Administração da Universidade de São Paulo (RAUSP), São Paulo, v.40, n.2, p.193- 205.

9. Appendix

Determinants of Corporate Ratings Research – 35 Companies
COPEL-CIA PARANAENSE ENERGIA
GERDAU SA
ULTRAPAR PARTICIPACOES SA
DUKE ENERGY INTL GERACAO
BRASKEM SA
ELETROBRAS-CENTR ELETR BRAS
CIA SANEAMENTO BASICO ESTADO
BRF SA
AMPLA ENERGIA E SERVICOS SA
COMPANHIA SIDERURGICA NACION
TELEMAR NORTE LESTE SA
USINAS SIDERURGICAS DE MINAS
FORJAS TAURUS SA
CIA DISTRIBUIDORA DE GAS DO
ELEKTRO ELECTRICIDADE SVC SA
ALL AMERICA LATINA LOGISTICA
ENERGISA MATO GROSSO
CIA ENERGETICA CEARA COELCE
CCR SA
JEREISSATI PARTICIPACOES SA
LOCALIZA RENT A CAR SA
ENERGISA S.A.
CPFL ENERGIA SA
DIAGNOSTICOS DA AMERICA SA
TAM SA
GAFISA SA
CELPA-CENTRAIS ELETRICAS
LUPATECH SA
CEMAR CIA ENERGETICA
TRACTEBEL ENERGIA SA
ULTRAPAR PARTICIPACOES SA
KLABIN SA
WHIRLPOOL SA
VALE SA
PETROLEO BRASILEIRO SA- PETR

Sovereign Downgrades Research - Companies
Vale SA Preference Shares
Petroleo Brasileiro SA Petrobras Preference Shares
Itau Unibanco Holding SA Preference Shares
Banco Bradesco SA Preference Shares
Banco do Brasil SA
Itausa - Investimentos Itau SA Preference Shares
Companhia Siderurgica Nacional
Petroleo Brasileiro SA Petrobras
BM&F Bovespa SA
Usiminas Pfd-A N1
Vale SA
Gerdau SA Preference Shares
Cielo SA
Ambev SA
Companhia Energetica Minas Gerais Preference Shares
CCR SA
Gafisa SA
PDG Realty SA Empreend e Participacoes
BR Malls Participacoes SA
TIM Participacoes SA
Hypermarcas SA
Oi SA Preference Shares
BRF SA
MRV Engenharia e Participacoes SA
JBS SA
Cyrela Brazil Realty SA Emprdts e Prtpcs
Banco Santander Brasil SA Unit
Companhia de Saneamento Basico-Sabesp
Natura Cosmeticos SA
Suzano Papel e Celulose SA Preference Shares Class A
Cia Hering
Lojas Renner SA
Telefonica Brasil SA Preference Shares
Braskem SA Preference Shares Series A
Companhia Brasileira de Distribuicao Preference Shares
Cetip SA Mercados Organizados
Klabin SA Preference Shares
Fibria Celulose SA
Lojas Americanas SA Preference Shares
Banco Bradesco SA

Kroton Educacional SA
Diagnosticos da America SA
Gol Linhas Aereas Inteligentes SA
Embraer SA
Ultrapar Participacoes SA
BR Properties SA
Bradespar SA Preference Shares
Centrais Eletricas Brasileiras SA Preference Shares Series B
Anhanguera Educacional SA
Localiza Rent a Car SA
Cosan SA Industria e Comercio
EDP - Energias do Brasil SA
Eletropaulo Metropolitn Eltrcd Sao Paulo Preference Shares
Centrais Eletricas Brasileiras SA
Duratex SA
Souza Cruz SA
Metalurgica Gerdau S.A. Preference Shares
Rossi Residencial SA
CESP Pfd-B N1
America Latina Logistica SA
Light SA
CPFL Energia S.A.
Marfrig Global Foods SA
Copel Pfd-B N1
Prumo Logistica SA
Brookfield Incorporacoes SA
B2W Companhia Digital
Oi SA
MMX Mineracao e Metalicos SA
Usinas Siderurgicas de Minas Grs SA Usms
Vanguarda Agro SA
CTEEP Cia Transm Energia Eletr Paulista Preference Shares

AAR – CAAR Event studies graphs for outlook changes.